REMARKS

Applicants traverse all objections, rejections and assertions made by the Examiner in response to the Office Action mailed April 5, 2002. Entry of the amendments and favorable reconsideration is respectfully requested.

Applicants have amended claim 10 by incorporating dependent claim 11 therewith. Applicants have amended claim 33 by incorporating dependent claim 45 therewith. Applicants have amended claim 47 consistent with the amendment to claim 33. Applicants have cancelled claims 11 and 45 without prejudice. No new matter has been added as a result of the amendments presented herein.

Drawing Objection

The drawings were objected to under 37 CFR 1.83(a) as not showing every feature of the invention specified in the claims. Applicants traverse the rejection.

Applicants have provided new Figures 8-12 showing every feature of the invention specified in the claims. Withdrawal of the objection is respectfully requested.

Specification Objection

The specification was objected to as missing serial numbers at page 24. Applicants have amended the specification updating issued patent numbers and providing the missing information at page 24. Withdrawal of the rejection is respectfully requested.

Claim Rejections

Rejections under 35 U.S.C. § 102(e):

Wunderman et al. (U.S. 6,122,042)

Claims 10, 11, 12, 15-18, 20, 33-39, 42-45, 47 and 48 were rejected under 35 U.S.C. § 102(e) as being anticipated by *Wunderman et al.* (U.S. 6,122,042). Applicants respectfully traverse the rejection.

Applicants assert that *Wunderman et al.* fail to disclose or suggest all the claimed elements. *Wunderman et al.* fail to disclose at least means for obtaining said target spectral data that includes measuring optical radiation reflected from sub-epidermal tissue of said target individual.

The Examiner cites column 37, line 62 as disclosing "optical subcutaneous identification". However, it is clear that this disclosure is limited to mechanical subcutaneous identifications. At column 37, line 66 to column 38, line 5, this reference discloses "the tissue between a pair of fingers pushes up on the IDEA and IDENTIFIER. Although various methods are available to sense and restore probe assembly positions, a linear displacement potentiometer can be used to register the extent of motion of each assembly. These displacement sensors are used in much the same way as those described in relation Fig. 9". Fig. 9 discloses IDEA probes that include linear displacement controller and/or sensor 146 that electrically adjusts and/or measures a distance d between the probe and the surface as determined by the position of moveable legs 148. The distance d can be provided as a variable to the processor for inclusion within the analysis and identification algorithm. See column 26, lines 34-39. Further support is found at column 39, lines 47 through 54: "an analogy to this electromechancial description of discrimination, all of the 240 optical throughput values from the LED/detector assemblies 168 will yield a mean square difference (MSD) between each respective pretrained value. The sum of the square's difference, along with the mechanically derived sum of the square's difference (appropriately weighted) provides the overall match criteria of identification." While it is unclear what this disclosure enables, it clearly fails to enable measuring optical radiation reflected from sub-epidermal tissue of said target individual.

For at least these reasons, this reference does not anticipate the claimed invention. Reconsideration and withdrawal of the rejection is respectfully requested.

Toyoda et al. (U.S. 5,999,637)

Claims 1, 10, 21-25, 33-38, 46, and 47 were rejected under 35 U.S.C. § 102(e) as being anticipated by Toyoda et al. (U.S. 5,999,637). Applicants respectfully traverse the rejection.

Toyoda et al. teach an apparatus and method for comparing two patterns that contain identifying information about an individual. Specifically, *Toyoda et al.* teach a method and apparatus to perform a mathematical correlation between two patterns to determine the degree of

similarity. As *Toyoda et al.* teach, the correlation of these two signals (equation 1, column 7, line 40) can alternatively be formulated as a function of the Fourier Transforms of each of the signals (equation 2, column 7, line 55). Thus, the Fourier spectra that *Toyoda et al.* refers to are spatial Fourier spectra of a fingerprint image. *Toyoda et al.* do not mention multiple wavelengths in this regard. As such, *Toyoda et al.* teach methods and apparatuses to compare two monochromatic images (especially fingerprint images) using a correlation-based methodology.

The claimed method and apparatus of the claimed invention are based on a measurement of the optical property of tissue measured at a plurality of wavelengths, resulting in optical spectra. The property of interest exists below the external surface of the skin. The Fourier Spectrometer used in one embodiment of the present invention effectively performs a Fourier Transform with respect to optical frequencies of light passing through it, rather than a Fourier Transform applied to an image any kind. The methods taught by the present invention for comparing two spectra include "Mahalanobis distances, spectral residual magnitudes, K-nearest-neighbor methods, linear or non-linear discriminant techniques" (page 9, lines 18-20). For at least these reasons, this reference does not anticipate the claimed invention. Reconsideration and withdrawal of the rejection is respectfully requested.

Rejections under 35 U.S.C. § 102(b):

Prokiski et al.

Claims 10, 33, 40 and 47 were rejected as being anticipated by *Prokoski et al.* Applicants traverse the rejection.

Prokiski et al. teach a method of collecting and processing "a thermal image of a portion of an individual's body" (column 3, lines 21-22). The resulting image is processed to define the "contours of the unique structural features of the individual" (column 3, lines 29-31), "such as the eye and nose area of the individual's face" (column 3, lines 33-34). An infrared imager such as a "platinum salicide staring array camera" (column 4, lines 43-44) is used to collect such data. As known to one of skill in the art, infrared imagers such as these typically operate within "atmospheric transmission windows" in a mid-infrared region where there are also significant mid-infrared emissions such as the "3-6 or 8-14 micron ranges" specified by *Prokoski et al.*

(column 4, line 51). The method and apparatuses taught by *Prokoski et al.* do not incorporate or rely on any feature that measures the infrared light at multiple different wavelengths. As such, the methods and apparatuses of *Prokoski et al.* are monochromatic, image-based means for identifying people based on external features.

The claimed methods and apparatus of present invention rely on measurements of a "plurality of wavelengths" of light that are preferably from light that is "diffusively reflected from the dermis and deeper tissue rather than the epidermis." (page 10, lines 4-5). The embodiments described use spectrometers such as "Fourier Transform System" (page 19, line 4), that do not form an image. As such, the identifying information taught by the present application is conveyed in the intensity of light at a plurality of wavelengths. For at least these reasons, this reference does not anticipate the claimed invention. Reconsideration and withdrawal of the rejection is respectfully requested.

<u>Stoianov et al.</u>

Claims 1, 10, 21, 33, 46 and 47 were rejected as being anticipated by *Stoianov et al.* Applicants traverse the rejection.

Stoianov et al. teach a method and apparatus for using frustrated total internal reflection to collect an image that is related to the "finger print image" (column 3, line 13). The fingerprint features of interest are spatially distributed on the surface of the fingertip. The illumination source for this system is monochromatic ("coherent light" column 1, line 60). The Fourier transform that is taken of the resulting image is a <u>spatial</u> Fourier transform (column 3, lines 19 and 20) consisting <u>spatial</u> frequencies (column 3, lines 22-23) and <u>spatial</u> amplitude and phase information (column 3, line 39). As such, *Stoianov et al.* teach a novel method for collecting and processing fingerprint images as the basis for a biometric determination.

The claimed method of the apparatus of the present invention are based on the measurement of optical properties of tissue measured at a plurality of wavelengths. The properties of interest exist below the external surface of the skin. Multiple skin locations can be used for this measurement. No image of the skin site is required. Fourier Spectrometer used in one embodiment of the present invention effectually performs a Fourier transform with respect to optical frequency of light passing through it. For at least these reasons, this reference does not

anticipate the claim invention. Reconsideration and withdrawal of the rejection is respectfully requested.

Rejections under 35 U.S.C. § 103(a):

Claims 1-3, 6-9, 19, 21-26, 29-32 and 46 were rejected under 35 U.S.C. § 103(a) over the combination of *Wunderman et al.* and *Hoshino et al.* (U.S. 4,944,021). Applicants traverse the rejection.

The Examiner applies *Hoshino et al.* as utilizing the reported identity of the target individual. *Hoshino et al.* fail to remedy the shortcomings of *Wunderman et al.* as described above. For at least these reasons, the references do not render the claimed invention obvious. Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 1, 21, 27 and 46 are rejected under 35 U.S.C. § 103(a) over the combination of *Prokoski et al.* (U.S. 5,163,094) and *Hoshino et al.* Applicants traverse the rejection.

The Examiner applies *Hoshino et al.* as utilizing the reported identity of the target individual. *Hoshino et al.* fail to remedy the shortcomings of *Prokoski et al.* as described above. For at least these reasons, these references do not render the claimed invention obvious. Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 10, 12-14, 20, 33 and 47 are rejected under 35 U.S.C. § 103(a) over the combination of *Messerschmidt* (U.S. 5,655,530), *Robinson et al.* (U.S. 4,975,581) and *Peterson et al.* (U.S. 6,330,346). Applicants traverse the rejection.

MPEP § 2143.01 provides: "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Applicants assert that this requisite motivation to combine the references is not present in the cited references. MPEP § 2143.02 states that a reasonable expectation of success must be present to combine references. Applicants assert the requisite expectation of success to combine the references is not present.

Messerschmidt teaches a method and apparatus for performing noninvasive measurements of an analyte in tissue (column 5, line 49) using multivariate techniques such as partial least squares (column 8, line 10) to produce a quantitative estimate of the amount of a substance (e.g. glucose) present in a sample (column 13, line 59). Such multivariate techniques establish a mathematical relationship between the spectral data and the analyte estimate of interest by using a set of calibration data (column 13, line 52). The calibration data consist of a set of optical spectra taken on samples with known amount of the analyte of interest (column 13 line 53) which is then used to determine a mathematical relationship between the spectra and the analyte estimates known as a calibration model (column 13, line 52). Once such a model is determined, it is applied to future optical spectra with unknown analyte values to produce the analyte estimate (*Robinson et al.*, column 5, line 5).

Peterson et al. teach an apparatus for collecting an "image" (column 2, line 2) of "subcutaneous objects and characteristics" (column 2, line 14). In order to do so, *Peterson et al.* teach that the array of light detectors must have a "minimum density of 625 elements per square inch arranged in a square matrix" (column 2, line 58). *Peterson et al.* also state that the corresponding grid of LED illuminators consists of "two wavelengths ... being of 720-750 nanometers and ... between 850 and 1000 nanometers" (column 3, line 16). Of note, *Peterson et al.* do not disclose the method by which the two kinds of LEDs are illuminated (simultaneously, alternately, one-by-one sequentially, etc.), and refer to the illumination light in the singular (e.g., "a grid of light-emitting elements of a wavelength", claim 2; "emitting a light", claims 1 and 6). Furthermore, *Peterson et al.* do not provide for a system to measure the intensity of a plurality of wavelengths of light (see Figure 1) by use of gratings, prisms, Fourier Transform spectrometers or other apparatuses and methods known to one of skill in the art.

The references fail to provide motivation to one of ordinary skill in the art to combine the references. The Examiner states that one would use the spectral analyte method of *Messerschmidt* or *Robinson et al.* for the purposes of identifying a target individual as taught by *Peterson et al.* in order to provide *Messerschmidt* with the additional and beneficial function of "reliably" detecting the identity of an individual using a method that is "not easily tampered with", is inexpensive and "can be used or readily placed in a large variety of structures without a great deal of physical alteration". These statements found in *Peterson et al.* are irrelevant to

Messerschmidt. Messerschmidt is solely concerned with analyte concentrations in **any** tissue sample not with identifying specific tissue samples.

There is no expectation of success that the analyte method of *Messerschmidt* could be modified to identify individuals. Indeed, the Examiner failed to provide any evidence of a reasonable expectation of success to combine the references.

For at least these reasons, these references do not render the claimed invention obvious. Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 1, 3-5, 19, 21 and 46 are rejected under 35 U.S.C. § 103(a) over the combination of *Messerschmidt*, *Robinson et al.*, *Peterson et al.* in further view of *Hoshino et al.* Applicants traverse the rejection.

The Examiner applies *Hoshino et al.* as utilizing the reported identity of the target individual. *Hoshino et al.* fail to remedy the shortcomings of *Messerschmidt, Robinson et al, and Peterson et al.* as described above. For at least these reasons, these references do not render the claimed invention obvious. Reconsideration and withdrawal of the rejection is respectfully requested.

Claim 41 is rejected under 35 U.S.C. § 103(a) over the combination of *Wunderman et al.* and *Itsumi et al.* (U.S. 5,559,504). Applicants traverse the rejection.

The Examiner applies *Itsumi et al.* as adding the target spectrum of the authorization spectra and after verification. *Itsumi et al.* fail to remedy the shortcomings of *Wunderman et al.* as described above. For at least these reasons, these references do not render the claimed invention obvious. Reconsideration and withdrawal of the rejection is respectfully requested.

Claim 28 is rejected under 35 U.S.C. § 103(a) over the combination of *Wunderman et al.* and *Hoshino et al.* in further view of *Itsumi et al.* (U.S. 5,559,504). Applicants traverse the rejection.

The Examiner applies *Itsumi et al.* as disclosing adding the target spectrum to the authorization spectrum after verification. *Itsumi et al.* fail to remedy the shortcomings of *Wunderman et al.* and *Hoshino et al.* as described above. For at least these reasons, these references do not render the claimed invention obvious. Reconsideration and withdrawal of the rejection is respectfully requested.

Conclusion

While additional features of the claims further distinguish these claims from the cited reference, a detailed discussion of this is believed to be unnecessary at this time in view of the basic differences pointed out by the Examiner.

Applicant respectfully request withdrawal of the objections and rejections and allowance of the claims. Should the Examiner feel a telephone interview would be helpful in advancing this case to allowance, Applicants invite the Examiner to contact the representative at the number listed below.

Respectfully submitted,

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By their Attorney,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification

Please make the following amendments to the specification as follows:

Please replace the paragraph spanning lines 16-23 on page 5 and lines 1-5 of page 6 of the application with the following:

Improved methods and apparatus for gathering and analyzing a near-infrared tissue spectrum for an analyte concentration are disclosed in commonly assigned U.S. Patent applications and issued patents. U.S. Patent No. 5,655,530 and U.S. Patent ~~Application Serial~~ No. ~~08/544,501~~ 5,823,951, filed April 18, 1997, entitled "Method for Non-invasive Blood Analyte Measurement with Improved Optical Interface" relate to near-infrared analysis of a tissue analyte concentration that varies with time, with a primary focus on glucose concentrations in diabetic individuals. The methods and apparatus include placing a refractive index-matching medium between a sensor and the skin to improve the accuracy and repeatability of testing. U.S. Patent Application Serial No. 09/174,812, filed October 19, 1998, entitled "Method for Non-Invasive Blood Analyte Measurement with Improved Optical Interface," now U.S. Patent No. 6,152,876, discloses additional improvements in non-invasive living tissue analyte analysis. The disclosure of each of these three applications or patents are hereby incorporated by reference.

Please replace the paragraph spanning lines 6-20 of page 6 of the application with the following:

U.S. Patent No. 5,636,633 relates, in part, to another aspect of accurate non-invasive measurement of an analyte concentration. The apparatus includes a device having transparent and reflective quadrants for separating diffuse reflected light from specular reflected light. Incident light projected into the skin results in specular and diffuse reflected light coming back from the skin. Specular reflected light has little or no useful information and is preferably removed prior to collection. U.S. Patent ~~Application Serial~~ No. ~~09/174,812~~ 5,935,062, filed June 9, 1997, entitled "Improved Diffuse Reflectance Monitoring Apparatus", discloses a further improvement for accurate analyte concentration analysis which includes a blocking blade device for separating diffuse reflected light from specular reflected light. The blade allows light from the deeper, inner dermis layer to be captured, rejecting light from the surface, epidermis layer, where the epidermis layer has much less analyte information than the inner dermis layer, and contributes noise. The blade traps specular reflections as well as diffuse reflections from the epidermis. The disclosures of the above patent and application, which are assigned to the assignee of the present application, are also incorporated herein by reference.

Please replace the paragraph spanning lines 6 on page 7 to line 10 of page 8 of the application with the following:

The present invention includes methods and apparatus for biometric identification or verification of individuals using optical spectroscopy in the near ultraviolet, visible or near-infrared spectral regions and combinations of those spectral regions. The methods and apparatus disclosed provide superior performance relative to current biometric systems as well as provide other advantages. Prior art biometric identification devices have the distinct disadvantage of requiring the use of specific body parts in order to achieve their techniques. For example, fingerprint devices require that only the extreme ventral portion of the fingers can be used as the biometric site. The methods and apparatus of the present invention enable biometric identification to occur with finger, palms, wrists, forearms and other convenient sites on the body. Further, even in the case of using fingers, the present invention allows use of multiple sites along the finger on both the dorsal or ventral surfaces. Present finger print readers require that the same finger be presented to the reader for identification or verification that was presented during the enrollment analysis. The present invention can use different fingers (or other sites) for enrollment and for subsequent verification. This capability provides for increased enrollment efficiency since the user only has to present one enrollment site to the system, but also provides critical flexibility during the use of the device. An example of this flexibility is the case where the user has enrolled a site on a particular hand and that particular site is unavailable for subsequent analysis due to some injury or some severe surface contamination of the site. This spectroscopic-based biometric system of the present invention can operate on the site from the other hand without previous enrollment of such site. Further, although the results below are based on optical systems that require contact with the skin surface, the optical system such as that disclosed in U.S. Patent ~~Application Serial~~ No. ~~08/871,366~~ 5,636,633 or U.S. Patent No. 5,935,062 discussed previously could be used in the present invention to generate similar data in a non-contact mode. Such a non-contact biometric sensor apparatus would have significant advantages when installed in public locations to minimize wear and contamination issues associated with critical optical elements.

Please replace the paragraph spanning lines 8-9 at line 8, page 14 of the application with the following:

-- Fig. 7 is a graph depicting receiver operating conditions for the biometric sensor of Fig. 6[.]; --

Please insert the following paragraphs at page 14, line 10 of the application.

--Fig. 8 is a block diagram depicting a preferred spectroscopic system method;

Fig. 9 is a block diagram showing an alternate method of a spectroscopic system;

Fig. 10 is a block diagram describing a spectroscopic system process;

Fig. 11 is a block diagram showing an alternate process for a spectroscopic system; and

Fig. 12 depicts the components of a process using a preferred spectroscopic system. --

Please replace the paragraph spanning line 19, page 15 to line 10, page 16 of the application with the following:

-- As previously stated and shown in Figure 12, there are two components believed of importance to the success of the method of the present invention. First, the method incorporates an apparatus and technique for accurately and repeatably acquiring a tissue spectrum 1200 that minimizes effects due to instrumental, environmental and sampling changes, while remaining sensitive to slight changes in the spectral properties of tissue at any given wave length. As well, the system optimizes optical throughput both into and out of the tissue sample. Second, the method requires specific techniques, such as an algorithm 1210, for training the instrument to identify spectral features of significance for that particular individual, and then to compare such features to new spectral data acquired at the time of attempted verification or identification. Because the spectral features or combinations of spectral features that are unique for a particular individual are not readily apparent or identified by visual comparison of a spectral result and the unique spectral features are present at different wavelengths for different individuals, the present invention relies on discriminant analysis techniques to compare spectral data. Each component of the apparatus and method of the present invention are detailed below.--

Please replace the paragraph spanning lines 15-23 of page 20 of the application with the following:

The input element 20 of the sensor element 11 can include optical fibers or an optical lens which focuses the light energy to a high energy density spot. However, it is understood that other beam focusing means may be utilized in conjunction with the optical lens to alter the area of illumination. For example, a multiple lens system, tapered fibers, or other conventional optical beam-shaping devices could be utilized to alter the input light energy. In other preferred embodiments, the sampler 36 can be of a non-fiber design consisting of a compound parabolic concentrated (CPC) to concentrate the light at the sample site, as disclosed in the above cited U.S. Patent Application entitled "~~System for Spectrographic Analysis of Tissue~~ Encoded Variable Filter Spectrometer."

Please replace the paragraph spanning lines 4-16 of page 21 of the application with the following:

In both embodiments depicted in Figs. 2 and 3, an output sensor 26 is utilized to receive reflected or transmitted light energy from the tissue 10. In a preferred embodiment, a specular control device is incorporated to separate the specular reflected light from diffusely reflected light. Such devices are disclosed in co-pending and commonly assigned U.S. Patent ~~Application Serial~~ No. ~~08/871,366~~ 5,935,062, filed June 9, 1997, and entitled "Diffuse Reflectance Monitoring Apparatus", the disclosure of which is incorporated herein by reference. As described in conjunction with a method of analysis below, the embodiment of Fig. 2 has an output sensor 26 which receives reflected light energy, while the embodiment of Fig. 3 includes an output sensor 26 which receives transmitted light through the tissue 10. As with the input element 20, the output element 26 is preferably an optical lens. Other optical collection means may be incorporated into an output element 26, such as a multiple lens system, tapered fiber, or other beam-collection means to assist in directing the light energy to the spectrum analyzer 30.

Please replace the paragraph spanning lines 8-22 of page 23 of the application with the following:

In Figure 1, the spectrometer subsystem 40 can include a variety of methods and apparatus. A preferred method of detecting optical spectra is achieved based upon optical interference phenomena such as in a Fourier transform infrared spectrometer system. One such system is disclosed in commonly assigned U.S. Patent Application Serial No. ~~__________~~ 09/832,585, entitled "~~Apparatus and Method for Improved Spectroscopic Resolution~~ System for Non-Invasive Measurement of Glucose in Humans," filed on even date herewith, and U.S. Patent Application Serial No. ~~__________~~ 09/832,631, entitled "~~System for Spectrographic Analysis of Tissue~~ Encoded Variable Filter Spectrometer," filed on even date herewith, the disclosures of which are both incorporated herein by reference. Other ways to detect optical spectra include using gratings, prisms, tunable filters, mock interferometers, Sagnac or common-path interferometers, and other means known to those of skill in the art. Many of these spectrometers also enable the spectrometer and detector to be treated as two distinct units with the spectral-separation occurring prior to the tissue. For example, an FTIR tunable filter, and a mock interferometer could all be placed prior to the tissue and impress an encoding on the light, which will subsequently be seen by the detector placed after the tissue as shown in Figure 1.

Please replace the paragraphs spanning line 14, page 24 to line 15, page 25 of the application with the following:

--In a preferred method as depicted in Figures 8 and 9, the identification or verification task is implemented when a person seeks to perform an operation for which there are a limited number of people authorized (e.g., perform a spectroscopic measurement, gain entry into a room, achieve control over an

interlocked vehicle or piece of machinery, pass through an immigration checkpoint, etc.). The person's spectral data is used for identification or verification of the person's identity. In this preferred method, the person initially enrolls in the system by collecting one or more representative tissue spectra in a database 800, 910 of a computer 900. If two or more spectra are collected during the enrollment, then these spectra be checked for consistency and recorded only if they are sufficiently similar, limiting the possibility of a sample artifact corrupting the enrollment data. For a verification implementation, an identifier 930 such as a PIN code, magnetic card number, username, badge, voice pattern, other biometric, or some other identifier would also be collected and associated with the confirmed enrollment spectrum or spectra.

In subsequent use, biometric identification would take place by collecting a spectrum 810, 920 from a person attempting to gain authorization. This spectrum would then be compared to the spectra in the enrolled authorization database 800, 910 and an identification made 830 if the match to an authorized database entry was better than a predetermined threshold. The verification task is similar, but would require that the person present the identifier in addition to a collected spectrum. The identifier would then be used to select a particular enrollment database spectrum and authorization would be granted if the current spectrum were sufficiently similar to the selected enrollment spectrum. If the biometric task is associated with an operation for which only a single person is authorized, then the verification task and identification task are the same and both simplify to an assurance that the sole authorized individual is attempting the operation without the need for a separate identifier.--

Please replace the paragraph spanning lines 11-23 on page 33 of the application with the following:

--In one method when identity verification 1100 is desired as shown in Figures 10 and 11, a tissue spectrum 1000, 1110 and purported identity 1010, 1120 are obtained from the target individual. The current tissue spectrum is subtracted from the appropriate enrollment spectrum, producing a spectral difference 1020. The spectral difference 1020 can then be decomposed using the factors generated from the calibration dataset and the consistency between the spectral difference and the calibration set can be calculated 1140. One calculation measures the Mahalanobis distance of the spectral difference with respect to the calibration factor set. If the distance is less than a threshold distance, then the purported identity can be positively verified 1030, 1130. Another calculation generates the spectral residuals of the spectral difference with respect to the calibration factor set. If the residuals are less than a predetermined threshold value, then the purported identity can be positively identified 1150. In another method, both the spectral residual and the Mahalanobis distance must be below their respective thresholds before identity is positively established.--

In the Claims

Please cancel claims 11 and 45 without prejudice.

Please amend claims 10, 33 and 47 as follows:

10. (Once Amended) A system for identifying a target individual comprising:

an enrollment database including tissue optical spectral data collected from one or more enrolled persons, said enrolled persons optical spectral data having a plurality of measurement values;

means for obtaining at least one tissue optical spectral data from said target individual, <u>wherein said means for obtaining said target individual spectral data includes means for measuring optical radiation reflected from sub-epidermal tissue of said target individual,</u> said target individual's optical spectral data having a plurality of measurement values;

means for comparing said target individual optical spectral data and said all enrolled persons optical spectral data, said comparison providing a measure of the degree of similarity between said target optical spectral data and said enrolled persons spectral data; and

means for indicating identity as at least one of the said enrolled persons if the corresponding measure of degree of similarity is at least as similar as an established threshold value.

33. (Once Amended) A method for identifying a target individual utilizing an enrollment database including tissue optical spectra collected from a number of enrolled individuals, said spectral data having a plurality of measurement wavelengths, comprising the steps of:

obtaining target tissue spectral data from said target individual, said target tissue optical spectral data having a number of measurement wavelengths<u>, wherein said tissue spectra include a substantial spectra contribution from sub-epidermal tissue</u>;

comparing said target individual optical spectral data and said enrolled person's optical spectral data, said comparison providing a measure of the degree of similarity between said target optical spectral data and each of said enrolled person's spectral data; and

positively establishing said target individual's identity by confirming that said target individual's measure of spectral similarity is at least as similar to one of the enrolled person's optical spectral data as an established threshold value.

47. (Once Amended) A method for identifying a target individual comprising the steps of:

obtaining a number of enrollment optical tissue spectra from a number of individuals, said enrollment tissue optical spectra having a plurality of measurement wavelengths;

obtaining a target tissue spectrum from said target individual, said target tissue spectrum having a number of measurement wavelengths<u>, wherein said tissue spectra include a substantial spectra contribution from sub-epidermal tissue</u>;

performing discriminant analysis on said target tissue spectrum and all of said enrolled tissue spectral data; and

positively identifying said target identity if, and only if, said discriminant analysis is satisfied for at least one of said enrolled persons optical spectral data.